throughout that Province. At the time of writing this article, 10 days after the storm struck Samar, telegraphic communication has not been restored as yet to the eastern part of the island, where the lowest barometric minimum is supposed to have been recorded and the greatest damage done by the rains, winds, and sea waves. The barometric minima recorded at Catbalogan and Calbayog were, respectively: 714.85 mm. (28.14 inches) at 6:46 p. m. of the 16th, and 720.13 mm. (28.35 inches) at 8:33 p. m. of the 16th. The position of the center at 6 p. m. of the 16th was 124° 55′ longitude E. and 11° 50′ latitude N.

After crossing the island of Samar the typhoon began to incline to NW. and NNW., the center being situated at 2 p. m. of the 17th to the NE. of Romblon in about 122° 30′ longitude E. and 13° 20′ latitude N. At 6 a. m. of the 18th the center passed about 50 miles to the east of Manila along the eastern coast of Luzon, moving N. by W. or NNW. Then, in the afternoon of the same day, the typhoon inclined again westward and entered the China Sea during the night of the 18th to 19th not far from 16° latitude N.

The storm had lost much of its intensity after it traversed Samar, it being only a shallow depression when it crossed Luzon to the north of Manila. Yet considerable damage was done in many of the Provinces near the center by heavy rains and consequent floods. In Manila the total daily rainfall for the 18th and 19th was 278.5 mm. (10.96 inches) and 243.7 mm. (9.60 inches), respectively, and the flood, which was the worst of this year, caused the water to be 1½ meters high in some of the lower portions of the city.

Once in the China Sea the depression or typhoon, after moving for about one day almost due west, remained almost stationary or moved very slowly for two days about 150 miles to the west of central Luzon, at the same time inclining again to the N. Finally, on the 21st, it recurved NE. and ENE., passing through the Balintang Channel on the 22d and entering again in the Pacific in the afternoon or evening of the same day.

DETAILS OF THE WEATHER IN THE UNITED STATES.

GENERAL CONDITIONS.

ALFRED J. HENRY.

The month, as a whole, presented no sharp extremes or pronounced departures from normal conditions; it was dry over the greater part of the area, especially in Pacific Coast States and also east of the Mississippi and south of the Ohio (see the inset on Chart IV). Due to the eastward movement of several shallow barometric depressions along the northern border, the temperature was above the average mainly in northern States (see Chart III). The usual details follow.

CYCLONES AND ANTICYCLONES.

By W. P. DAY.

There was an increase in the number of cyclones and anticyclones charted as compared with the preceding month. This is a normal tendency due to increased temperature gradients between polar and equatorial zones and a corresponding increase in the rapidity of air interchange between these regions. However, the low-pressure areas or cyclones with one or two exceptions were not important as storms, and the high-pressure areas, being largely of the north Pacific type, did not cause any important depressions of the temperature.

FREE-AIR SUMMARY.

By L. T. SAMUELS, Meteorologist.

A noticeable feature of the mean free-air temperatures for the month was the general continuation of like departures both in sign and magnitude from the surface to the highest altitudes reached by the kites. (See Table 1.) Ordinarily the departures become appreciably smaller with increasing altitude, with a tendency to approach zero. Climatological Chart III shows a striking contrast between large positive departures in the northern part of the country and negative departures in the South. Free-air departures are found to conform to these to a large extent.

Relative humidities averaged very close to their normals for all stations and levels.

Vapor-pressure departures followed, in general, those for temperature except at Ellendale, where a very considerable deficiency for the month was found. With the large positive temperature departures found at this station there would ordinarily be expected a considerable excess in the mean vapor pressures. However, this was not the case, there being only small positive departures from the surface to 1,500 m., above which they were negative. In this connection it is interesting to note that only 0.23 of an inch of precipitation occurred during the month, the smallest amount for November since the establishment of the station.

In Table 2 are shown the resultant wind directions and velocities for the month. Generally good agreement is found between the resultant direction as compared with the normals and the corresponding monthly temperature departure, that is, a positive temperature departure is usually accompanied by a more southerly or less northerly wind component than normally, and vice versa.

Resultant winds for the month based on afternoon pilot-balloon observations made at 10 regular Weather Bureau stations, in addition to six regular aerological stations, make possible the determination of the resultant atmospheric drift over the country as a whole. However, as yet, large sections, such as the Pacific coast and the plateau region, are inadequately represented by single stations, the Army and Navy stations not taking regular observations at this time of the year, and only comparatively low altitudes are obtained. At 1,000 m. above the surface these showed a westerly drift east of the Rocky Mountains except at Key West, south of west over New England and the Southern Plains States, north of west over the Missouri Valley, Denver, and Middle Atlantic States, due west over the Lake region and Memphis, east of north over San Francisco, north of east over Key West, and due east over San Juan and Curacao, Danish West Indies (the latter station being maintained through cooperation with the Dutch Government and located in latitude 12° N., longitude 69° W.). At 2,000 m. the direction was north of west at all mainland stations except Burlington, where it remained S. 57° W. and due east at San Juan and south of east at Curacao. At 4,000 m. this continued, with the exception of San Francisco, which became east of north, San Juan at this level also being slightly north of west, while Curacao remained south of east. Practically no change was found at 5,000 m. except at Curacao, which became

slightly north of east. Above this level the number of observations decreases rapidly and therefore reliable resultants can not be determined. It is interesting to note, however, that those based on what observations were made are remarkably consistent in that they show a general drift of about N. 20° W. over all the stations except San Francisco, which continued east of north to 8,000 m., and Key West and San Juan, where a more nearly west direction was found. At Curacao a turning to north occurred, becoming slightly west of north above 8,000 m. There is a clear evidence in these higher levels of the resultant directions turning to westerly at successively higher altitudes from higher to lower latitudes.

On the 3d, when an area of high pressure was centered over New England and the Middle Atlantic States, Burlington and Washington, being within the region of highest pressure, obtained high balloon ascensions which were in extremely close agreement throughout. A southerly wind was found at the surface, first increasing in velocity to about 10 m. p. s. between 2 and 3 kilometers, then decreasing to nearly calm at about 5 kilometers where a veering to northwest occurred. This upper wind increased rapidly at both stations, reaching a velocity of 34 m. p. s. at 12 kilometers above Washington.

On the 5th when an extensive Pacific HIGH covered the country west of the Mississippi River, aerological observations made at the stations under its control revealed its influence to considerable altitudes. This area of high pressure moved slowly across the country, overspreading a vast amount of territory. A deep northerly current prevailed to the east of its center with north and northeast winds extending to at least 8,000 m. on some days. On the 10th two centers were apparent, Ellendale being situated northwest of the center which was over Wyoming. The afternoon balloon observation at this station showed a moderate northwest wind at the ground with decreasing velocity to 5,000 m., where practically a calm obtained, above which a moderate east wind prevailed to 9,600 m., the limit of the observation. The following morning showed a complete reversal, i. e., a moderate south wind at the ground becoming strong at 3,500 m., the highest level reached. On the 11th, when the center of the HIGH had moved to Madison, Wis., light winds were found to 10,000 m., the direction mostly north changing to northeast at 9 and 10 kilometers. By the next day a similar reversal occurred, showing moderate to strong south winds from the ground to 5,000 m., the top of the observation. On this date (12th), Lansing, south of the center, had a moderate east wind from the ground to 8,000 m., above which the direction was northwest to 13,000 m. At this station the following date showed also a change to south from the ground to 5,000 m. Above this, however, the northwest current obtained to at least 14,000 m.

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during November, 1923.*

TEMPERATURE (° C.).

Altitude, m. s. l. (m.)	Broken Arrow, Okla. (233 m.)		Drexel, Nebr. (396 m.)		Due West, S. C. (217 m.)		Ellendale, N. Dak. (444 m.)		Groesbeck, Tex. (141 m.)		Royal Center, Ind. (225 m.)	
	Mean.	Departure from 6-yr. mean.	Mean.	Departure from 9-yr. mean.	Mean.	Departure from 3-yr. mean.	Mean.	Departure from 6-yr. mean.	Mean.	Departure from 6-yr. mean.	Mean.	Departure from 6-yr. mean.
Surface	9.1	−0.7	4.7	+1.1	9.2	−2.4	2.5	+4.5	12.2	−0.8	5.3	+0.3
250	9.0	−0.7	.....	.....	9.1	−2.3	.....	.....	12.0	−0.8	5.2	+0.4
500	8.8	+0.1	4.7	+1.2	8.2	−2.2	2.7	+4.7	11.5	−0.7	4.2	+0.8
750	8.1	+0.2	4.8	+1.6	7.1	−2.2	3.7	+5.5	10.7	−0.9	3.3	+0.8
1,000	7.4	0.0	4.7	+1.5	7.0	−1.6	3.8	+5.2	10.0	−1.1	2.6	+0.7
1,250	6.5	−0.4	4.1	+1.1	7.0	−1.1	3.0	+4.4	9.2	−1.1	1.9	+0.4
1,500	5.4	−0.8	3.2	+0.7	6.2	−1.1	2.4	+4.1	8.4	−1.2	1.4	+0.4
2,000	3.3	−1.0	1.3	+0.5	4.5	−1.2	0.4	+3.7	6.8	−0.8	−0.5	+0.2
2,500	1.0	−1.2	−1.1	+0.4	2.6	−1.1	−2.0	+3.5	4.9	−0.6	−2.5	0.0
3,000	−1.5	−1.4	−3.6	+0.6	0.2	−1.1	−4.6	+3.4	2.7	−0.4	−4.7	0.0
3,500	−3.6	−1.1	−6.1	+0.8	−2.1	−0.7	−7.3	+3.5	0.2	−0.1	−6.8	−0.1
4,000	−5.6	−0.7	−8.9	+0.8	−4.5	−0.3	−10.3	+3.4	−2.5	0.0	−9.3	+0.3
4,500	−8.4	−1.0	−11.4	+0.9	.....	.....	−13.1	+3.4	−5.9	−0.4	−12.1	+0.3
5,000	−11.0	−1.0	−14.2	+1.0	.....	.....	.....	.....	−9.9	−1.2	.....	.....

RELATIVE HUMIDITY (PER CENT).

Surface	73	+6	71	−1	70	+2	73	−7	75	+1	72	−2
250	72	+5	.....	.....	70	+2	.....	.....	72	0	72	−2
500	63	0	68	−1	67	+2	71	−7	65	−2	68	−5
750	58	−2	61	−3	64	+2	63	−9	61	−2	65	−5
1,000	56	−2	56	−3	60	0	58	−8	59	−1	63	−3
1,250	52	−2	51	−4	57	−1	55	−6	56	−1	62	+1
1,500	49	−1	49	−4	56	−1	51	−6	52	−2	58	+1
2,000	45	−1	46	−4	54	+4	45	−8	41	−8	53	+1
2,500	46	+3	46	−4	51	+4	43	−9	37	−8	52	+4
3,000	45	+2	46	−5	49	+4	43	−9	35	−6	54	+8
3,500	40	0	45	−7	49	+3	43	−10	35	−5	54	+9
4,000	32	−3	46	−6	49	+3	46	−9	32	−5	58	+17
4,500	33	+2	49	+1	.....	.....	50	−6	32	−4	54	+17
5,000	34	+2	51	+6	.....	.....	.....	.....	33	−2	.....	.....

VAPOR PRESSURE (*mb.*).

Surface	8.20	−0.01	6.11	+0.27	7.43	−1.85	5.39	+0.82	10.55	−1.20	6.40	−0.29
250	8.14	0.00	.....	.....	7.32	−1.81	.....	.....	10.03	−1.28	6.32	−0.29
500	7.26	−0.10	5.83	+0.24	6.58	−1.62	5.32	+0.83	8.80	−1.40	5.54	−0.35
750	6.34	−0.40	5.28	+0.23	5.88	−1.48	4.91	+0.75	7.72	−1.44	5.02	−0.28
1,000	5.83	−0.43	4.78	+0.18	5.47	−1.30	4.44	+0.61	7.02	−1.30	4.56	−0.14
1,250	5.09	−0.63	4.22	−0.05	4.89	−1.25	4.00	+0.47	6.30	−1.12	4.16	−0.01
1,500	4.46	−0.67	3.71	−0.23	4.43	−1.16	3.57	+0.32	5.62	−1.00	3.68	−0.02
2,000	3.54	−0.58	3.01	−0.25	3.81	−0.50	2.72	−0.03	4.13	−0.98	2.86	−0.13
2,500	3.05	−0.25	2.50	−0.23	3.22	−0.33	2.24	−0.10	3.44	−0.50	2.45	+0.13
3,000	2.59	−0.16	2.00	−0.30	2.71	−0.20	1.84	−0.10	2.90	0.00	2.15	+0.08
3,500	1.97	−0.12	1.64	−0.25	2.55	−0.04	1.50	−0.09	2.62	+0.36	1.73	+0.05
4,000	1.34	−0.11	1.41	−0.11	2.13	+0.02	1.30	−0.03	2.30	+0.69	1.31	+0.63
4,500	1.13	+0.13	1.28	+0.11	.....	.....	1.18	−0.05	2.14	+1.05	0.82	+0.63
5,000	0.96	+0.13	1.16	+0.33	.....	.....	.....	.....	2.08	+1.30	.....	.....

TABLE 2.—*Free-air resultant winds (m. p. s.) during November, 1923.*

Altitude, m. s. l. (m.)	Broken Arrow, Okla. (233 meters).				Drexel, Nebr. (396 meters).				Due West, S. C. (217 meters).				Ellendale, N. Dak. (444 meters).				Groesbeck, Tex. (141 meters).				Royal Center, Ind. (225 meters).			
	Mean.		6-year mean.		Mean.		9-year mean.		Mean.		3-year mean.		Mean.		6-year mean.		Mean.		6-year mean.		Mean.		6-year mean.	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 71° W.	1.0	S. 44° W.	1.0	S. 50° W.	1.3	S. 82° W.	1.3	N. 18° W.	1.4	N. 63° W.	0.7	S. 85° W.	3.1	N. 52° W.	2.0	N. 14° E.	0.5	N. 35° E.	0.4	S. 67° W.	1.0	S. 40° W.	1.6
250	S. 72° W.	1.1	S. 39° W.	1.0	.....	.....	.....	.....	N. 7° W.	1.5	N. 60° W.	0.7	.....	.....	.....	.....	N. 33° E.	0.2	N. 75° W.	0.5	S. 68° W.	1.1	S. 52° W.	2.5
500	S. 72° W.	1.9	S. 26° W.	2.2	S. 82° W.	1.9	S. 86° W.	2.0	N. 10° W.	2.0	N. 70° W.	1.2	S. 77° W.	2.4	N. 63° W.	2.2	S. 15° W.	0.9	S. 24° E.	0.9	S. 66° W.	2.0	S. 54° W.	4.4
750	S. 73° W.	2.9	S. 32° W.	2.9	N. 81° W.	3.3	N. 89° W.	3.5	N. 7° W.	2.2	N. 75° W.	1.7	S. 84° W.	4.6	N. 64° W.	3.7	S. 36° W.	1.4	S. 20° W.	1.4	S. 74° W.	2.2	S. 61° W.	5.6
1,000	S. 87° W.	4.0	S. 46° W.	3.5	N. 74° W.	5.2	N. 89° W.	4.8	N. 31° W.	2.0	N. 82° W.	2.4	N. 86° W.	5.6	N. 67° W.	4.6	S. 61° W.	1.3	S. 46° W.	1.9	N. 85° W.	2.8	S. 67° W.	6.4
1,250	N. 87° W.	4.0	S. 55° W.	4.3	N. 75° W.	5.5	N. 87° W.	5.7	N. 48° W.	2.7	N. 81° W.	3.6	N. 77° W.	7.2	N. 69° W.	5.5	N. 89° W.	1.7	S. 63° W.	2.7	N. 77° W.	3.6	S. 71° W.	7.3
1,500	N. 84° W.	4.3	S. 63° W.	4.7	N. 76° W.	6.3	N. 86° W.	6.7	N. 63° W.	3.3	N. 85° W.	4.9	N. 72° W.	7.7	N. 67° W.	6.6	N. 69° W.	1.9	S. 71° W.	3.5	N. 84° W.	3.8	S. 74° W.	7.9
2,000	N. 73° W.	4.6	S. 70° W.	6.2	N. 76° W.	7.9	N. 83° W.	7.8	N. 68° W.	4.6	N. 86° W.	7.0	N. 70° W.	7.7	N. 67° W.	8.2	N. 58° W.	3.7	S. 82° W.	4.9	N. 61° W.	4.9	S. 82° W.	9.2
2,500	N. 78° W.	5.3	S. 78° W.	6.9	N. 77° W.	10.0	N. 80° W.	9.4	N. 63° W.	6.6	W.	8.9	N. 69° W.	9.2	N. 65° W.	10.7	N. 65° W.	5.1	S. 87° W.	7.0	N. 59° W.	6.8	S. 83° W.	11.1
3,000	N. 81° W.	6.4	S. 77° W.	8.5	N. 71° W.	10.9	N. 78° W.	10.7	N. 68° W.	6.9	N. 87° W.	10.4	N. 70° W.	11.8	N. 67° W.	12.6	N. 65° W.	5.7	S. 86° W.	8.4	N. 60° W.	8.5	N. 87° W.	12.4
3,500	N. 79° W.	7.5	S. 80° W.	8.8	N. 69° W.	10.1	N. 75° W.	11.3	N. 87° W.	9.4	W.	12.7	N. 72° W.	12.9	N. 66° W.	13.6	N. 63° W.	7.0	S. 75° W.	10.2	N. 84° W.	9.9	N. 86° W.	12.1
4,000	N. 83° W.	8.7	S. 82° W.	10.8	N. 73° W.	8.8	N. 80° W.	12.5	S. 78° W.	9.6	N. 85° W.	14.4	N. 70° W.	14.2	N. 65° W.	12.9	N. 80° W.	7.7	S. 70° W.	8.7	N. 62° W.	6.9	S. 89° W.	10.0
4,500	N. 72° W.	8.0	S. 89° W.	9.8	N. 49° W.	4.2	N. 84° W.	12.6	.....	.....	.....	.....	N. 78° W.	17.8	N. 60° W.	15.8	S. 82° W.	13.5	S. 66° W.	10.2	N. 46° W.	5.3	N. 71° W.	7.6
5,000	S. 82° W.	14.0	S. 64° W.	12.6	N. 18° W.	8.0	N. 81° W.	11.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....